

WHAT IS CLAIMED IS

1. A capacitor comprising a lower electrode formed on a substrate, an upper electrode opposed to the lower electrode, and a capacitor dielectric film formed between the lower electrode and the upper electrode,

at least one of the lower electrode and the upper electrode being an electrode of a metal substituted layer.

2. A capacitor according to claim 1, further comprising an insulation film formed on the capacitor, an opening is formed in the insulation film down to the electrode of the metal substituted layer, and

a conductor plug formed integrally with the electrode of the metal substituted layer in the opening.

3. A capacitor according to claim 2, wherein the electrode of the metal substituted layer is divided in a plurality of sectional electrodes, openings are formed for the respective sectional electrodes, and

conductor plugs are formed in the respective openings integrally with the sectional electrodes.

4. A capacitor according to claim 3, wherein the electrode of the metal substituted layer is divided in stripes, and

the sectional electrodes are formed in stripes.

5. A capacitor according to claim 4, wherein

a plurality of the openings are formed down to both ends of the sectional electrodes.

6. A capacitor according to claim 3, wherein the electrode of the metal substituted layer is radially divided, and

the sectional electrodes are formed in fans.

7. A capacitor according to claim 2, wherein the electrode of the metal substituted layer is formed in a mesh.

8. A capacitor according to claim 7, wherein a plurality of the openings are formed down to vicinities of the ends of the mesh-shaped electrode.

9. A capacitor according to claim 1, wherein the lower electrode or the upper electrode includes a semiconductor layer which is not substituted with the metal.

10. A capacitor according to claim 9, wherein the semiconductor layer is in contact with the capacitor dielectric film.

11. A capacitor according to claim 1, wherein the metal substituted layer is formed of Al, Cu, Au, Pt, Ag or Ru.

12. A capacitor according to claim 2, further comprising on the insulation film an electrode pad or a wiring layer integrally formed with the conductor plug.

13. A capacitor according to claim 2, wherein a concentration gradient of the atom substituted with the

metal atom is present from the electrode of the metal substituted layer toward the conductor plug.

14. A capacitor according to claim 12, wherein a concentration gradient of the atom substituted with the metal atom is present in the electrode pad or in the wiring layer.

15. A method for fabricating a capacitor comprising the steps of:

forming a lower electrode on a substrate;  
forming a capacitor dielectric film on the lower electrode;  
forming an upper electrode on the capacitor dielectric film;

forming an insulation film on the upper electrode;  
forming an opening in the insulation film down to the lower electrode;

forming a metal layer on the insulation film; and  
substituting a constituent atom of the lower electrode with a metal atom of the metal layer through the opening to thereby form the lower electrode of a metal substituted layer.

16. A method for fabricating a capacitor comprising the steps of:

forming a lower electrode on a substrate;  
forming a capacitor dielectric film on the lower electrode;  
forming an upper electrode on the capacitor dielectric film;

forming an insulation film on the upper electrode;  
forming in the insulation film a first opening down to

the lower electrode and a second opening down to the upper electrode;

forming a metal layer on the insulation film; and substituting a constituent atom of the lower electrode with a metal atom of the metal layer through the first opening to thereby form the lower electrode of a metal substituted layer and substituting a constituent atom of the upper electrode with a metal atom of the metal layer through the second opening to thereby form the upper electrode of a metal substituted layer.

17. A method for fabricating a capacitor comprising the steps of:

forming a lower electrode on a substrate;  
forming a capacitor dielectric film on the lower electrode;  
forming an upper electrode on the capacitor dielectric film;

forming an insulation film on the upper electrode;  
forming an opening in the insulation film down to the upper electrode;

forming a metal layer on the insulation film; and substituting a constituent atom of the upper electrode with a metal atom of the metal layer through the opening to form the upper electrode of a metal substituted layer.

18. A method for fabricating a capacitor according to claim 15, wherein

a plurality of the sectional electrodes are formed in the step of forming the lower electrode and/or the step of forming

the upper electrode.

19. A method for fabricating a capacitor according to claim 16, wherein

a plurality of the sectional electrodes are formed in the step of forming the lower electrode and/or the step of forming the upper electrode.

20. A method for fabricating a capacitor according to claim 17, wherein

a plurality of the sectional electrodes are formed in the step of forming the lower electrode and/or the step of forming the upper electrode.

21. A method for fabricating a capacitor according to claim 18, wherein

in the step of forming the lower electrode and/or the step of forming the upper electrode, the sectional electrodes are formed in a strip-shape;

in the step of forming the opening, a plurality of the openings are formed down to both ends of the sectional electrodes; and

in the step of forming the lower electrode of the metal substituted layer and/or the step of forming the upper electrode of the metal substituted layer, the sectional electrodes are substituted with the metal from both ends of the sectional electrodes.

22. A method for fabricating a capacitor according to claim 19, wherein

in the step of forming the lower electrode and/or the step of forming the upper electrode, the sectional electrodes are formed in a strip-shape;

in the step of forming the opening, a plurality of the openings are formed down to both ends of the sectional electrodes; and

in the step of forming the lower electrode of the metal substituted layer and/or the step of forming the upper electrode of the metal substituted layer, the sectional electrodes are substituted with the metal from both ends of the sectional electrodes.

23. A method for fabricating a capacitor according to claim 20, wherein

in the step of forming the lower electrode and/or the step of forming the upper electrode, the sectional electrodes are formed in a strip-shape;

in the step of forming the opening, a plurality of the openings are formed down to both ends of the sectional electrodes; and

in the step of forming the lower electrode of the metal substituted layer and/or the step of forming the upper electrode of the metal substituted layer, the sectional electrodes are substituted with the metal from both ends of the sectional electrodes.

24. A semiconductor device comprising a capacitor including a lower electrode formed on a substrate, an upper

electrode opposed to the lower electrode, and a capacitor dielectric film formed at least between the lower electrode and the upper electrode; and

at least one of the lower electrode and the upper electrode is an electrode of a metal substituted layer.